The voluntary [Workforce Framework for Cybersecurity](#) (NICE Framework) was developed through a collaborative process by industry, academia, and government stakeholders. It establishes a taxonomy and common lexicon that describes cybersecurity work and is intended for use in both the public and private sectors. NIST does not validate or endorse any individual organization or its approach to using the NICE Framework.

ORGANIZATIONAL PROFILE

Secure Decisions was created as a division of Applied Visions, Inc. to conduct research and development and develop innovative technologies in cybersecurity, including application security, cybersecurity education, network defense, and infrastructure protection. Secure Decisions develops cutting-edge technologies focused on improving the human decision-making in cybersecurity. A small business based in Northport, NY, our cybersecurity education research projects have been funded by customers such as the U.S. Air Force Research Laboratory, U.S. Department of Homeland Security, and National Science Foundation.

DRIVERS

- Secure Decisions received a grant from Department of Homeland Security, Science & Technology Directorate, Cyber Security Division to create novel cybersecurity education technology. Our idea was to use graphic storytelling: creating branching web comics aligned with instructional goals: readers of the comic are asked to make choices for a character; these choices lead to different scenes that illustrate the consequences (good or bad) of that choice.
- To enable this approach, Secure Decisions created Comic-BEE (https://www.comic-bee.com), a web application that scaffolds educators, subject matter experts, and authors though four workflows to create an educational, branching web comic. The workflows include: creating a lesson plan; creating a branching script aligned with the lesson plan; visually laying out a storyboard of that script scene by scene; and, finally, converting the storyboards to full color comic panels and publishing the comics.
- Customers wanted to also use branching web comics to evaluate cybersecurity knowledge of the workforce. Comics need only an HTML5-compliant browser —no expensive labs, environments, or software for clients to download.
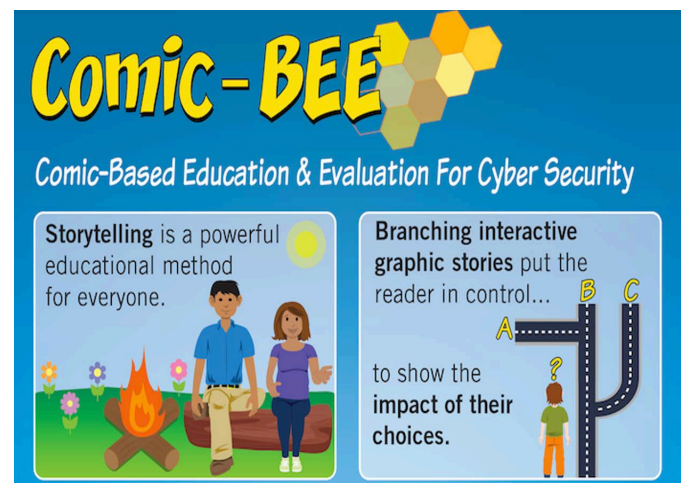

Figure 1: Comic-BEE approach

PROCESS

Comic-BEE already used a hierarchical approach to scaffold authors through the process of creating a lesson plan, the first part of creating an educational, branching web comic. Authors define at least one high-level concept, then drill down to more granular Knowledge, Skills and Abilities (KSAs) related to that concept. Lastly, for each KSA, authors identify low-level, concrete learning objectives, which are statements

describing specific things a learner needs to be able to do.

The NICE Framework's hierarchical structure of Categories, Specialty Areas, Work Roles, and Tasks/KSAs aligned well with this existing approach. Using a spreadsheet version of the NICE Framework, the Comic-BEE development team integrated the framework into Comic-BEE's lesson plan database. An option was added to the Comic-BEE lesson plan workflow, allowing authors to choose to use the NICE Framework or create their own lesson plan. Now, when an author chooses the NICE Framework for their lesson plan, they just select a Category from a list of drop-down options. A similar list of available Specialty Areas is auto-populated based on the selected Category for the author to select from. This process repeats through Work Roles and Tasks and KSAs (KSAT). Authors can then add their own learning objectives for each KSAT. Authors can easily use multiple Work Roles and different Categories within the same comic.

Figure 2: The NICE Framework integrated into the Comic-BEE workflow

TIE-IN WITH THE NICE FRAMEWORK

The NICE Framework appears as an option on the very first page in the process of creating a comic. This has introduced the existence of the NICE Framework to many people previously unaware of of it: hundreds of our users have been computer science students creating comics about cyber ethics as a college course assignment. One client developed a comic using the NICE Framework to introduce corporate executive leadership to cybersecurity risk management and the NICE Framework. We were able to demonstrate competitions or challenges aligned with specific Work Roles by creating scored comics using the NICE Framework as the core of the lesson plan—without needing virtual environments or software downloads.

> "Integrating the NICE Framework into the lesson planning capabilities of Comic-BEE allows curriculum designers to rapidly create interactive curriculum or assessments aligned with industry needs."
>
> – Laurin Buchanan, Principal Investigator, Secure Decisions

BENEFITS & IMPACT

The customizable, hierarchical view of the NICE Framework in Comic-BEE can provide a complete view of a Work Role, enabling a comic to be not just aligned with the NICE Framework but customized for the unique combination of Work Roles, KSAs and Tasks relevant for a specific job at an organization. Integrating the NICE Framework allowed Comic-BEE to support the rapid creation of interactive curriculum aligned with industry needs by enabling curriculum designers to focus on specific learning objectives supporting KSAs and Tasks, particularly those not addressed through current training and certifications.
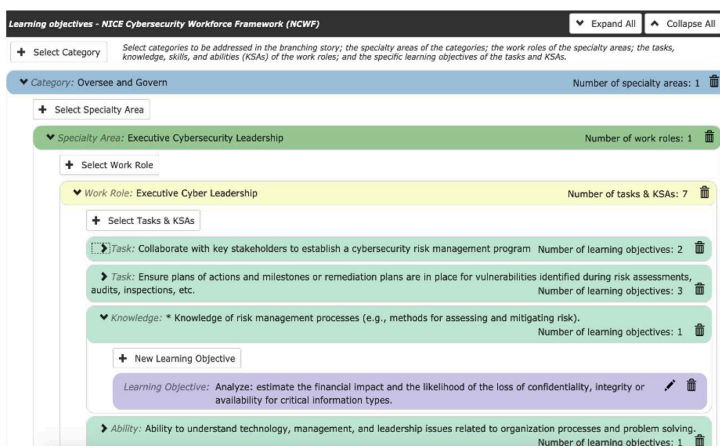
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